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Phosphates from the Kotchari deposit, Burkina Faso.

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Samples of phosphorites from different occurrences of the Kotchari deposits, Burkina Faso, were studied. They are phosphorites that are fine-grained with small quantities of clay. The chemical analyses by XRF indicate a CaO content of 35.98 to 41.33 wt%. and a P₂O₅ contents of 26.85 to 30.75 wt%.

The XRD patterns shows that the major phases are Carbonate-Fluorapatite (Francolite), Hydroxyapatite and alpha-Quartz. They coexist with minor phases that are Wavellite and Maricite. Small quantities of phyllosilicates, smectite and Illite, are also detected. The quantities of phases were obtained by Rietveld refinements with the MAUD software, using reference phases from usual databases. The obtained fits are satisfactorily, although the significant occurrence of peaks overlapping and broadening. In this study, quantitative Rietveld analysis has shown its effectiveness in accurately identifying and quantifying the mineralogical composition of phosphorites.

FTIR analyses further validate the identification of mineral phases. They show typical bands from phosphates groups in structures. Bands of carbonates groups are also detected and a band is correlated with the occurrence of structural F in Francolite. The relative Intensities of some bands from P-O bonds are related to the crystallinity index of main phosphate minerals. Values of the crystallinity index are slightly above the medium values, that is correlated with the partial substitution of carbonate groups in phosphate crystallographic sites, and with the occurrence of structural Fluor ions. The economic importance of the Kotchari deposits for soil fertilization in agriculture is recognized, and they were the subject of successive mapping and survey works. However, the medium crystallinity index is a disadvantage since it reduces the kinetic of phosphor assimilation in agricultural soils, needing complementary researches.

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